1. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -14$ and choose the interval that $f^-1(-14)$ belongs to.

$$f(x) = 3x^2 + 5$$

A. $f^{-1}(-14) \in [2.77, 3.81]$

B. $f^{-1}(-14) \in [2.33, 3.07]$

C. $f^{-1}(-14) \in [5.4, 6.07]$

D. $f^{-1}(-14) \in [0.99, 1.76]$

E. The function is not invertible for all Real numbers.

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2. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = e^{x-5} - 2$$

A. $f^{-1}(10) \in [-2.64, -2.2]$

B. $f^{-1}(10) \in [7.04, 7.51]$

C. $f^{-1}(10) \in [0.21, 1.68]$

D. $f^{-1}(10) \in [-0.58, -0.36]$

E. $f^{-1}(10) \in [-0.38, 0.5]$

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3. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-5} - 5$$

A. $f^{-1}(8) \in [7.2, 8]$

B. $f^{-1}(8) \in [-3.8, -1.4]$

C. $f^{-1}(8) \in [-6.4, -2.6]$

D. $f^{-1}(8) \in [-3.8, -1.4]$

E. $f^{-1}(8) \in [-6.4, -2.6]$

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4. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{2}{5x - 28} \text{ and } g(x) = 4x^2 + 6x + 2$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-0.4, 7.6]$

B. The domain is all Real numbers except $x = a$, where $a \in [-0.4, 6.6]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.5, 9.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.17, 12.17]$ and $b \in [3.25, 8.25]$

E. The domain is all Real numbers.

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5. Determine whether the function below is 1-1.

$$f(x) = 18x^2 + 312x + 1014$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. Yes, the function is 1-1.

D. No, because there is a y-value that goes to 2 different x-values.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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6. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = x^3 + 4x^2 - 3x - 3 \text{ and } g(x) = 3x^3 - 1x^2 - x - 1$$

A. $(f \circ g)(1) \in [4.2, 9.3]$

B. $(f \circ g)(1) \in [-7.2, -3.6]$

C. $(f \circ g)(1) \in [-3.9, 0.9]$

D. $(f \circ g)(1) \in [1.7, 4.4]$

E. It is not possible to compose the two functions.

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7. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 12$ and choose the interval that $f^-1(12)$ belongs to.

$$f(x) = 5x^2 + 3$$

A. $f^{-1}(12) \in [1.53, 2.27]$

B. $f^{-1}(12) \in [2.76, 3.9]$

C. $f^{-1}(12) \in [0.8, 1.48]$

D. $f^{-1}(12) \in [4.01, 5.49]$

E. The function is not invertible for all Real numbers.

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8. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 + x^2 - x \text{ and } g(x) = -x^3 + 4x^2 + 4x$$

A. $(f \circ g)(-1) \in [13, 17]$

B. $(f \circ g)(-1) \in [-2, 0]$

C. $(f \circ g)(-1) \in [-12, -5]$

D. $(f \circ g)(-1) \in [21, 23]$

E. It is not possible to compose the two functions.

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9. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-6x - 19} \text{ and } g(x) = 4x^2 + 6x + 4$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-3.17, -1.17]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.17, 11.17]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [0.6, 9.6]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [6.25, 11.25]$ and $b \in [3.2, 10.2]$

E. The domain is all Real numbers.

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10. Determine whether the function below is 1-1.

$$f(x) = 9x^2 + 120x + 400$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. Yes, the function is 1-1.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because there is a y-value that goes to 2 different x-values.
